In the Claims:

1-23. (Canceled)

24. (Currently Amended) A communication system comprising:

a first communication device including,

a digital signal source;

~~an analog signal source;~~

~~an analog to digital converter coupled to the analog signal source;~~

a quadrature amplitude modulation unit coupled to the digital signal source ~~and the analog to digital converter~~;

a first pulse shaping filter coupled to the quadrature amplitude modulation unit, the first pulse shaping filter being characterized in that the frequency domain response ~~mets~~ meets the Nyquist criteria and that the square root of the frequency domain response has a first derivative that is continuous at all points, the pulse shaping filter having an impulse response corresponding to the square root of the frequency domain response;

a modulator coupled to receive a signal from the pulse shaping filter; and

a transmitter coupled to the modulator; and

a second communication device including

a receiver;

a demodulator coupled to the receiver;

a second pulse shaping filter, the second pulse shaping filter being matched to the first pulse shaping filter and being characterized in that the frequency domain response ~~mets~~ meets the Nyquist criteria and that the square root of the frequency domain response has a first derivative

that is continuous at all points, the pulse shaping filter having an impulse response corresponding to the square root of the frequency domain response;

a quadrature amplitude demodulation unit coupled to the second pulse shaping filter; and

a signal ~~ouput~~ output coupled to the quadrature amplitude demodulation unit.

25. (Previously presented) The communication system of claim 24 wherein the first communication device is a base unit and the second communication device is a terminal unit.

26. (Previously presented) The communication system of claim 24 wherein the transmitter broadcasts signals at radio frequency.

27. (Previously presented) The communication system of claim 24 wherein the frequency domain response NF(ω), is represented by the following equations:

$$NF(\omega) = T\text{, when } |\omega| \le \frac{\pi}{T}(1-\alpha)$$

$$NF(\omega) = \frac{T}{2}\left(1-\sin\left\{\frac{\pi}{2}\sin\left[\frac{T}{2\alpha}\left(|\omega|-\frac{\pi}{T}\right)\right]\right\}\right)\text{, when } \frac{\pi}{T}(1-\alpha) \le |\omega| \le \frac{\pi}{T}(1+\alpha)$$

$$NF(\omega) = 0\text{, when } \frac{\pi}{T}(1+\alpha) \le |\omega|$$

wherein ω is frequency, T is a time period between symbols, and α is a roll-off factor.

28. (New) The communication system of claim 24 wherein digital signal source comprises an analog signal source coupled to an analog-to-digital converter.

29. (New) The communication system of claim 24 and further comprising:

an analog signal source; and

an analog-to-digital converter coupled between the analog signal source and the quadrature amplitude modulation unit.

30. (New) A digital communications unit comprising:

a signal source; and

a Nyquist filter coupled to the signal source, the filter having a characteristic of a square root of a Nyquist function in the frequency domain, the filter further being characterized in that the square root of the frequency domain response has a first derivative that is continuous at all points.

31. (New) The digital communications unit of claim 30 wherein the frequency domain response, $\sqrt{NF}$, is represented by the following equations:

$$\sqrt{NF} = \sqrt{T}\text{, when } |\omega| \leq \frac{\pi}{T}(1-\alpha)$$

$$\sqrt{NF} = \sqrt{\frac{T}{2}}\left(1-\sin\left\{\frac{\pi}{2}\sin\left[\frac{T}{2\alpha}\left(|\omega|-\frac{\pi}{T}\right)\right]\right\}\right)^{1/2}\text{, when } \frac{\pi}{T}(1-\alpha) \leq |\omega| \leq \frac{\pi}{T}(1+\alpha)$$

$$\sqrt{NF} = 0\text{, when } \frac{\pi}{T}(1+\alpha) \leq |\omega|$$

wherein ω is frequency, T is a time period between symbols, and α is a roll-off factor.

32. (New) The digital communications unit of claim 30 wherein the signal source comprises an analog-to-digital converter.

33. (New) The digital communications unit of claim 30 wherein the signal source comprises a receiver.

34. (New) A digital signal processor comprising:

a memory device storing a look-up table for an impulse response for a filter, the filter having a characteristic of a square root of a Nyquist function in the frequency domain, the filter further being characterized in that the square root of the frequency domain response has a first derivative that is continuous at all points; and

a digital signal processor core, wherein the memory device is integrated on the same integrated circuit as a digital signal processor core.

35. (New) The digital signal processor of claim 34 wherein the frequency domain response, $\sqrt{NF}$, is represented by the following equations:

$$\sqrt{NF} = \sqrt{T}\text{, when } |\omega| \le \frac{\pi}{T}(1-\alpha)$$

$$\sqrt{NF} = \sqrt{\frac{T}{2}\left(1-\sin\left\{\frac{\pi}{2}\sin\left[\frac{T}{2\alpha}\left(|\omega|-\frac{\pi}{T}\right)\right]\right\}\right)}^{1/2}\text{, when } \frac{\pi}{T}(1-\alpha) \le |\omega| \le \frac{\pi}{T}(1+\alpha)$$

$$\sqrt{NF} = 0\text{, when } \frac{\pi}{T}(1+\alpha) \le |\omega|$$

wherein ω is frequency, T is a time period between symbols, and α is a roll-off factor.